

Series 70  
Portable Computers



# Hewlett-Packard Series 70 Portable Computers

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## Table of Contents

The HP-75 Portable Computer— You Can Take It Anywhere .....	1
HP-75 Key Features .....	3
HP-75 Hardware Overview .....	4
HP-75 Software Overview .....	6
HP-75 Hardware .....	7
Peripherals .....	10
Instruments .....	16
Interfaces .....	17
HP-75 Software .....	18
Software Development Tools .....	20
Series 70 Custom Products Program .....	20
Users' Library .....	20

# The HP-75 Portable Computer— You Can Take It Anywhere

The HP-75 is the portable computer for professionals on the move. As powerful as a personal computer, as small as a book, the HP-75 gives you the answers you need wherever and whenever you need them.

## Enjoy Fast and Easy Solutions.

Prepare a 30-day income projection on the 7 a.m. to Chicago? Type a letter-perfect trip report on the 6:05 home? That's right. With an HP-75 and our ready-to-go software, you can perform spreadsheet analysis and create text on a plane or in a hotel room, at home, or in the office. To evaluate alternative courses of action, to ask "what if?" questions, and to

get your answers almost instantaneously, simply plug in an HP-75 VisiCalc® module. To write memos, letters, reports, and other short documents quickly and easily, choose Text Formatter software. You can generate hard-copy output of your formatted text or program an HP graphics plotter to create high-quality color slides.

To get up-to-date information for your applications, you can use our acoustic coupler. Working with Data Communications software, the coupler lets the HP-75 communicate with other computers over telephone lines. Dial up stock market data and educational and message services

such as THE SOURCE™, the Dow Jones News/Retrieval Service®, and CompuServe. Tap your office or lab computer from the field. If electronic mail figures in your future, our coupler or an HP-11/85-232C interface with any standard modem, may be the right solution.

If you frequently work away from your desk, you'll appreciate the HP-75's file structure. It lets you store multiple VisiCalc worksheets and other files simultaneously. You can load programs, data, and appointment files at the office, then call them up once you're out in the field.

You'll also like the way the HP-75's typewriter-like keyboard lets you touch-type to enter data fast, even with it resting on your lap. And the way you can redefine almost every key to become another character, expression, command, or to execute a program.

## Make Every Minute Count.

You can rely on the HP-75's appointment and time modes to keep you on schedule. When each of your appointments comes due, the computer turns itself on, emits one of nine alarms, and displays the reminder message you entered. You don't have to worry about turning the computer off. The HP-75 automatically puts itself into deep sleep when the job's done. And you don't have to worry about losing your programs or data. Continuous Memory saves your information even when the HP-75 is turned off.

VisiCalc® is a registered trademark of VisiCorp.

The SOURCE™ is a service mark of Source Information Corp., a subsidiary of Reader's Digest Association.

Dow Jones News/Retrieval Service® is a registered trademark of Dow Jones & Company, Inc.



#### Get Yourself Free.

With the HP-75, you can leave the office and still have immediate access to personal computer power. There are 19K bytes of user memory (RAM) built in, and you can expand it to 24K bytes with an optional 5K-byte plug-in module. With 24K bytes of RAM and a 16K-byte built-in ROM operating system, you have plenty of memory for problem solving. You also have the option of using as many as three plug-in ROM modules with up to 32K bytes each. The HP-75 uses convenient battery power. Three rechargeable nickel-cadmium batteries run for two to three weeks of normal use or 20 to 30 hours of continuous use.

You can even carry around your own personal computing system in a briefcase. Or, you can create a desktop system for the office or lab. You get this flexibility because the HP-75's built-in HP-41 (Hewlett-Packard Interface Loop) lets you access a variety of portable, battery-powered devices for mass storage, printing, plotting, and measurement.

#### In the Laboratory.

Whether you're crunching numbers, creating sophisticated programs, or performing real-time data logging, the HP-75 backs you up with the power, accuracy, and versatility you need.

#### Solve It With Software.

You've got two software media to choose from. You can take advantage of ready-recorded software solutions with plug-in modules, such as HP-75 Application Packages (VisiCalc, Text Formatter, Math, Surveying, and Data Communications). Or you can load ready-written solutions from magnetic cards in disciplines such as math, engineering, and finance from HP-75 Solutions Books.

#### Take Control.

With built-in HP-41, the HP-75 can talk to and work with devices such as battery-powered mass-storage drives and printers. It can control instruments such as digital multimeters and data acquisition and control devices. And using a variety of interface converters it can communicate with desktops such as HP Series 80, 100, and 200 computers and large mainframes such as the HP 1000 and the HP 3000.



# Hewlett-Packard

## HP-75 Key Features



# Hewlett-Packard HP-75 Hardware Overview

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## For Putting it Down on Paper:



HP 8262A HP/IL Thermal  
Printer/Plotter . . . . . 11



HP 82905B Impact Printer . . . . . 12



HP 2671A/C Alphabetic/  
Copiers Printers . . . . . 13

## For Reading and Storing Data:



HP 82161A Digital Cassette Drive . . . 15



HP 3498A Digital Multimeter . . . 16



HP 3421A Data Acquisition/  
Control Unit . . . . . 16

**For Drawing Your Own  
Conclusions:**



HP 7470A Graphics Plotter . . . . 14

**For Building HP-IL  
Into Your Product:**



HP 82166C HP-IL Interface Kit . . . 17

**For Enhancing Your  
Performance:**



HP 82300A 8K-Byte  
Memory Module . . . . . 9

**For Communicating With Other Computers,  
Peripherals, and Instruments:**



HP 82168A Acoustic Coupler . . . 15



HP 82163 HP-IL  
32-Column Video Interface . . . . . 17



HP 82164A RS-232C Interface  
HP 82165A GPIB Interface  
HP 82169A HP-BB Interface  
HP 82306A Series 80 Personal  
Computer Interface . . . . . 17

# Hewlett-Packard HP-75 Software Overview

## Clinch That Sale.

When making that important presentation to your client, you want the tools that will help you make the sale quickly and efficiently. You also need access to information critical to the buying decision. This professional depends on the HP-75 when selling life insurance. The relevant information, contained on pocketable cassettes, can be accessed speedily through the cassette drive. His HP-75 quickly ploughs through complex formulas to give his clients the correct answer. And with the HP-75's VisiCalc software the rep can calculate the options that are best for them. He also brought along an HP-II, video interface so that the information could be displayed, right on their own TV screen. The rep can even provide them with a printout of all the options. So, no matter where your job takes you, let the HP-75 help make you an instant success.

## For General Business:

Application Packages .....	18
• VisiCalc .....	18
• Text Formatter .....	20
• Data Communications .....	26
• Math .....	22

## Solutions Books .....

• Graphics .....	18
• Math I .....	
• Math II .....	
• Math III .....	
• Finance .....	
• Real Estate .....	
• Statistics .....	
• Mass Media Duplication/Privacy .....	
• I/O Utilities .....	

## For Entertainment:

Solutions Books .....	28
• Games I .....	
• Games II .....	



## For Engineering:

Application Packages .....	18
• VisiCalc .....	18
• Text Formatter .....	20
• Data Communications .....	26
• Surveying .....	24
• Math .....	22

## Solutions Books .....

• Electronics .....	28
• Math I .....	
• Math II .....	
• Math III .....	
• Statistics .....	
• Test Statistics .....	
• Graphics .....	
• Mass Media Duplication/Privacy .....	
• I/O Utilities .....	

## For Science:

Application Packages .....	18
• VisiCalc .....	18
• Math .....	22
• Text Formatter .....	20
• Data Communications .....	26

## Solutions Books .....

• Math I .....	28
• Math II .....	
• Math III .....	
• Statistics .....	
• Test Statistics .....	
• Graphics .....	
• Mass Media Duplication/Privacy .....	
• I/O Utilities .....	



# Hewlett-Packard

## HP-75 Hardware

### HP-75 Portable Computer

The HP-75 is a battery-powered portable computer that matches the information handling capability and accuracy of larger desktop computers. It weighs only 26 ounces and measures 10 by 5 by 1.25 inches. This fully-integrated computer may be used alone or configured as part of an HP-11, (Hewlett-Packard Interface Loop) briefcase system or an HP-11, desktop system.

- The HP-75 contains a CMOS version of a Series 80 Personal Computer CPU for speed and accuracy.
- The built-in 48K-byte ROM BASIC Operating System has more than 100 system and BASIC commands and 41 numeric functions to choose from.
- With the HP-75's multiple file structure, any number of files, up to available memory space, may be in memory at the same time. You can keep text and BASIC files.
- A built-in appointment function provides personal scheduling, audio alarm, and message options. A clock/calendar function lets you create or use clock/calendar-dependent programs. Programs or commands may be executed unattended.
- The HP-75 offers a maximum of 24K bytes of RAM, with 16K bytes built in and an optional 8K-byte memory module. Three ports hold up to 66K bytes of applications ROM modules.
- Continuous Memory saves data and programs even when the HP-75 is turned off.

#### Features

- 8-bit CMOS Series 80 Personal Computer CPU.
- Built-in 48K-byte ROM BASIC language operating system.
- 16K-byte RAM plus optional 8K-byte RAM plug-in.
- 3 software module plug-in ports hold up to 33K bytes each.
- Touch-type QWERTY keyboard.
- Battery power.
- Built-in HP-11 interface.
- Built-in hand-pulled card reader.
- Multiple file structure.

#### Benefits

- Fast and efficient data processing.
- Priority programming; fast math calculations, efficient time management; more than 98 percent of RAM free for your applications.
- Plenty of memory.
- Customized problem-solving. Up to 66K of software ROM.
- Easy, fast, and accurate data entry.
- Use it anywhere.
- Printing and mail storage anywhere; remote communication via telephone lines; expanded display capability.
- Convenient and inexpensive off-line storage of data and programs.
- Instant access to most commonly used programs.

- The HP-75 has a touch-type keyboard that lets you enter data fast. And you can redefine more than 180 keys or key combinations.
- Simple keystrokes call up a "hidden" numeric keypad for quick input of numeric data.
- Built-in HP-11 lets your HP-75 communicate with HP computers, peripherals, and instruments in a variety of ways to suit specific needs.
- A built-in card reader lets you store data and information inexpensively on small magnetic cards, up to 1.5K bytes per card.
- The liquid-crystal display acts as a 32-character window on a 96-character line. You view the entire

- line by scrolling. The 256-character set includes both upper- and lowercase ASCII characters with true descenders, as well as several special characters.
- Three rechargeable nickel-cadmium batteries permit two to three weeks of normal use between charges or 30 to 30 hours of continuous operation.

## Physical Specifications

**DIMENSIONS** . . . 12.7 cm (5 in) x 23.4 cm  
(8.0 in) x 3.2 cm (1.25 in)

**WEIGHT** . . . . .332.1 g (12 oz)

## POWER REQUIREMENTS

**Batteries** . . . . .560mAh Battery Pack  
(HP 620003)

**Battery Current** . . . . .(load case) . . . 25 mA (RUN mode)  
(no-load case) . . . . .providing 20 to 30 hours  
of RUN mode operation  
(approximately 2 to  
3 weeks between re-  
charging)  
14 mA (STANDBY mode)  
20  $\mu$ A (HOLDUP mode)

## OPERATING REQUIREMENTS

**Operating**  
temperature . . . . .0° to 40°C (32° to 104°F)  
**Recharging**  
temperature . . . . .10° to 40°C (50° to 104°F)  
**Storage**  
temperature . . . . .-40° to 55°C  
(-40° to 131°F)  
**Humidity** . . . . .4 to 95% relative  
humidity

## DISPLAY

Liquid-crystal display  
Character font . . . . .3 x 9-dot matrix  
Capacity . . . . .36 characters per line  
Window size . . . . .32 characters  
Character set . . . . .326 characters

## CHARACTER RANGE

A-Z, a-z, 0-9, plus 27 special characters, with  
or without underlining

## DYNAMIC RANGE

**Real precision** . . . . .0.00000000000000 to  
-1E-49, 0, 1E+49 to  
0.00000000000000  
**Short precision** . . . . .0.000000 to -1E-49,  
0, 1E+00 to 0.999999  
**Integer precision** . . . . .00000 to 99999  
**Variable types** . . . . .Numeric, String,  
Numeric array

## CLOCKS & TIMERS

Project and clock calendar, 12-hour or 24-hour  
format. Time functions return time to the  
nearest millisecond.  
Accuracy range . . . . .1% uncalibrated to 3  
minutes/month  
Adjustable clock speed . . . . .10%

## BEZELS

The bezel is programmable with parameters  
for duration and tone. The frequency  
range is approximately 1 to 1600 Hz.

## REDEFINABLE

**KEYS** . . . . .104

## MULTIPLE FILE STRUCTURE

The number of files in HP-79C memory is  
limited only by the amount of available  
RAM.

## LANGUAGE

Extended HP BASIC (167 instructions)

## MEMORY

**Random operating**  
system ROM . . . . .448B  
Theory (256K plug-in  
ROMs for an additional  
544B ROM)  
**Random user RAM** 144B  
**Enhancement Memory Module**  
(HP 62700A) . . . . .64B  
**Maximum system RAM**  
(with Memory  
Module) . . . . .256B

## INTERFACE

Built-in HP-E-Interface-Packed Interrupt Loop

## OFF-LINE MASS STORAGE

Built-in Card Reader, hand pulled

## CONTINUOUS MEMORY

Retains data and programs even when the  
computer is turned off.

## THE HP-79C PORTABLE COMPUTER COMES COMPLETE WITH

HP-79C Owner's Manual  
Reference Manual  
HP-79C Owner's Pin  
Keyboard Overlay Kit  
Accessory Hardware  
Service Card  
Field Case  
Rechargeable Battery Pack  
AC Adapter/Recharger  
HP-91 Cable  
Card Holder

## HP-79C Functions List

### NUMERIC FUNCTIONS

ABS—Absolute value  
ACOS—Arccosine  
ANGLE—Arc tangent of y/x  
ARND—Ar cosine  
ATN—Arctangent  
CIR—Circular integer %s  
COS—Cosine  
COSD—Cosine deg  
COSC—Cosine cent  
DABS—Abs in fixed format  
DEG—Radian-to-degree conversion  
EXP—Exponential machine function  
ERR1—Line number of most recent error or  
warning  
ERRN—Identification number of most recent  
error or warning  
EXP—Exp  
FCNPR—Largest integer < x

FP—Fractional part  
ISG—Largest machine number  
INT—Largest integer  $\leq$  x  
IP—Integer part  
LEN—String length  
LOG—Natural logarithm  
LOG10—Base 10 log  
MAX—If x > y then x, else y  
MEM—Available memory in bytes  
MIN—If x < y then x, else y  
MOD—Modulo  
NUM—Decimal code of the first character in  
a string  
PI—3.1415926535  
POS—Position of a character in a string  
RAD—Degree-to-radian conversion  
RND—Random result  
RNDI—Random int  
RNDL—Random number  
RND—Random  
SGN—Sign of a number (+ or -)  
SIGN—Sign  
SQ—Positive square root  
TAN—Tangent  
TIME—Number of seconds since midnight  
VAL—Numeric value of a string  
**STRING FUNCTIONS**  
CATS—Concatenate of a file  
CHRS—Character with decimal code MOD  
(0-255)  
DATEF—Date in y/m/d format  
DEVS—Display character of currently dis-  
played line  
SEVS—Converts a numeric to a string  
TIMER—Time in milliseconds format, using  
24-hour notation  
UPRCS—Converts input string to uppercase  
letters  
VEND—No character string indicating the  
operating system version  
TAB—Tabulate  
**TIME MODE COMMANDS**  
ADST—Displays ADST template  
EXAM, T—Examine mark  
BSET1—Clears EXACT marks and corrects  
speed adjustment level  
SET—Displays settime template  
SAST1—Displays SAST1 template  
**BASIC STATEMENTS**  
ASSIGN #—Assigns file number to a file  
name  
BEEP—Causes a tone to sound at specified  
frequency and duration  
CALL—Calls a program from within another  
program  
DATA—Numeric or string constants for use  
by READ  
DEF FN—Defines user-defined function or  
multi-line function  
REAL—Dimensions array  
DISP—Displays array

**DISP LINFO**—Displays information according to IMAGE statement.

**END**—Terminates program.

**END DEL**—Defines end of multiline user-defined function.

**FOR ... TO ... STEP**—Defines beginning of FOR-NEXT loop.

**GOTO**—Branches to a series of statements.

**GOTO**—Unconditionally branches to a line number.

**IF ... THEN ... ELSE**—Tests condition and branches.

**INFILE**—Specifies the output format for DISP USING and PRINT USING.

**INPUT**—Allows input of data from the keyboard.

**INTEGER**—Dimensions and reserves memory for integer precision numeric variables.

**LET**—Assigns value to one or more variables.

**LET FN**—Assigns a value to a function.

**NEXT**—Defines end of FOR-NEXT loop.

**OFF ERROR**—Disables user-defined error trapping.

**OFF TIMER #**—Disables a program timer.

**ON ... GOTO**—Initiates user-defined error trapping.

**ON TIMER #**—Sets a program timer.

**ON ... GOTO**—Computed GOTO.

**OPENIN IMAGE**—Defines lower bound of all arrays in a program.

**POP**—Returns a pending subroutine return.

**PRINT**—Prints information.

**PRINT #**—Sends data from a data file.

**PRINT USING**—Prints information according to IMAGE statement.

**PUT**—Simulates pressing of corresponding key or keyboard combination.

**RANDOMIZE**—Computes new random number seed.

**SAVE**—Assigns values from DATA statements to variables.

**SAVE #**—References data items from a data file.

**REAL**—Dimensions and reserves memory for real variables.

**REM**—Program remarks.

**RESTORE**—Restarts data pointer to a DATA statement.

**RESTORE #**—Restarts data pointer to line of data file.

**RETURN**—Causes program to branch from subroutines to statement following the branching statement that initiated the subroutines.

**SHORT**—Dimensions and reserves memory for short precision numeric variables.

**STOP**—Holds program.

**WAIT**—Interrupts program execution for a specified period of time.

## SYSTEM COMMANDS

**ALARM OFF**—Ignores due appointments.

**ALARM ON**—Restores normal handling of due appointments.

**ASIGN ID**—Assigns device codes to peripheral devices.

**AT TO**—Registers automatic line numbering.

**BLIP ON**—Enables beeper.

**BLIP OFF**—Disables beeper operation.

**BT**—Rests computer bit.

**CAL**—Displays catalog entry of the specified file.

**CAT ALL**—Accesses complete system catalog.

**CAT CATALOG**—Displays catalog information recorded on card back.

**CLEAR LINK**—Resets all HP41 devices to their initial states.

**CLEAR VAR**—Clears values of variables.

**CONT**—Continues program execution.

**COPY**—Copies specified file to memory to specified destination.

**DEFAULT OFF**—Carries use of default values for trigonometric/mathematical expressions.

**DEFAULT ON**—Restores use of default values for trigonometric/mathematical expressions.

**OFF KEY**—Resets key or keyboard combination.

**DELAY**—Specifies length of time computer will wait between display lines.

**DELETE**—Deletes specified line(s).

**DISP L#**—Designates specified device as a various display device.

**EDIT**—Moves the pointer to specified file.

**ENDLINE**—Redefines the end of line.

**FITCH**—Fits to specified line.

**FITCH KEY**—Resets current definition of specified key or keyboard combination.

**INITIALIZE**—Prepares machine to store information.

**LIST**—Lists one or more lines of specified file on the display.

**LIST #**—Lists device codes of assigned HP41 devices on the display.

**LOCK**—Locks computer against use without specified password.

**MARZIP**—Sets margins.

**MERGE**—Merges lines from specified file into current file.

**NAME**—Renames current file and creates and/or renames.

**OFF RX**—Suspends HP41 communications.

**OPTION ANGLE DEGREES**—Sets trigonometric mode to degrees.

**OPTION ANGLE RADIANS**—Sets trigonometric mode to radians.

**PAUSE**—Pauses machine on specified mass storage device.

**PRINT**—Lists line(s) of specified file on current system printer.

**PRINTER #**—Designates specified device as a printer device.

**PROTECT**—Protects magnetic card from being overwritten.

**PURGE**—Deletes file from memory.

**PWENTR**—Sets line length for PRINT and PRINT statements.

**RENAME**—TO—Changes name of specified file in memory.

**RENAMEFILE**—Renames specified portion of file.

**RESTORE RX**—Restores HP41 communications.

**RUN**—Registers program execution.

**STANDBY OFF**—Rests computer off after five minutes of inactivity.

**STANDBY ON**—Sets the computer to stay on indefinitely.

**TRACEFLOW**—Sets the computer to display source and destination line numbers of branch in program execution.

**TRACE VAR**—Sets the computer to display line number and variable name.

**TRANSFER**—Transfers one type of file to memory into another.

**UNPROTECT**—Removes write protection from magnetic card.

**WIDTH**—Sets line length for DISP and LIST instructions.

## ARITHMETIC OPERATORS

+, -, \*, /, %, DIV, INT

## LOGICAL OPERATORS

AND, OR, XOR, NOT

## RELATIONAL OPERATORS

=, <, >, <=, >=, <>, <=, >=

## HP41C/42C 8K-BYTE MEMORY MIDDLE

This subdirectory gives you an additional 8K bytes of programmable memory. It simply plugs into the HP41C to give you a maximum of 24K bytes of RAM.

## HP41C ACCESSORIES

Owner's Manual 90075-00001  
Reference Manual 90075-00001  
Rechargeable Battery Pack 92004B  
Recharge Power Pack 92004A  
Recharge for Recharge Power Pack (110 volt) 92004A  
AC Adapter/Recharge 92005B  
Security Cables 92004A  
Field Case 92005A  
30 Blank Magnetic Card Pcs 92004A  
100 Blank Magnetic Card Pcs 92004A  
Overlay Kit (quantity 1) 92004A  
Keyboard Card (quantity 1) 92004A  
Blank Overlay Kit (quantity 1) 92004A  
Requires an HP 92004A Recharge (110 volt).

# Hewlett-Packard Peripherals

## HP 82161A Digital Cassette Drive

The HP 82161A battery-powered digital cassette drive provides convenient data-handling capability for Series 70 and Series 40 computers. With 128K bytes of on-line mass storage packed into each mini-cassette, you have the power for applications which previously required a larger computer. And you can access files quickly, thanks to variable record length, file-by-name organization, and a tape directory.

All tape movement is under microprocessor control, so you don't waste time. Average rewind time is under 30 seconds, read/write operations are executed at nine inches per second, and search speed is 30 inches per

### Features

- Battery-powered.
- 128K bytes per cassette.
- Variable record length, file-by-name organization, tape directory.
- Internal buffer space.
- STANDBY mode.

### Benefits

#### Take it anywhere

More than ten times the RAM capacity of the HP-75, more than 10 times the RAM capacity of the HP-41C.

Access data quickly and easily, save the space.

Minimize tape motion and access time.

HP-IL controller carries drive on or off from a remote location; conserves battery power.

second. You get buffer space for temporary storage of directory information, making access even faster.

The HP 82161A can locate your files under program control. It features battery-saving STANDBY mode

that lets a Series 40 controller turn the drive on or off from remote locations. Programming is required for Series 70 to perform this function. See the HP-75 I/O Utilities Solutions Book, 00075-15013.

### Physical Specifications

**DIMENSIONS** ..... 17.8 cm (7.0 inches) x 13.2 cm (5.2 inches) x 6.1 cm (2.4 inches)

**WEIGHT** ..... 298 g (1.0 lb)

#### POWER REQUIREMENTS

Battery ..... 12-volt (clear cell), 4.4 to 6 volts, quick-charge, nickel-cadmium battery pack.

#### Full recharging

time ..... 18 to 18 hours (drive turned on or off)

Usage ..... ON—2 watts maximum (motor off)

ON—3.5 watts maximum (motor on)

STANDBY (on)—2.3 watts maximum (motor off)

STANDBY (off)—3.8 watts maximum (motor reeling)

STANDBY (off)—0 watts maximum (motor off)

#### DATA FORMAT

Number of tracks ..... 2

Density ..... 578 bits per centimeter (800 bits/inch)

Format ..... 254 bytes per record (8 bits per byte)

Formatted capacity 512 records (511,672 bytes)

Encoding method ..... bi-phase level phase recording

#### DRIVE MECHANISM

Type ..... two motor, belt drive

Read/Write speed ..... 25 centimeters (9.8 inches) per sec

Search/Rewind speed ..... 30 centimeters (11.8 inches) per sec

INTERFACING

Type ..... HP-IL (Hewlett-Packard Interface Loop)

Default address on power up ..... unconfigured

Default address after auto address unconfigured ..... 2

#### OPERATING REQUIREMENTS

##### Operating

temperature ..... 0° to 40°C (32° to 104°F)

##### Charging

temperature ..... 10° to 40°C (50° to 104°F)

Storage temperature without tape ..... -40° to 70°C (-40° to 157°F)

without tape ..... -40° to 70°C (-40° to 157°F)

#### DIGITAL CASSETTE

Type ..... Hewlett-Packard Mini-Data Cassette (HP 82161A)

Tape length ..... 24 m (80 ft)

##### Temperature

limits ..... 10° to 40°C (50° to 104°F)

Humidity (tape storage) limits ..... 20% to 80% relative humidity

SPECIAL MODES

Standby

## HP 82162A

### Thermal Printer/Plotter

The HP 82162A provides fast print-outs with 24-character lines. It's battery-powered, so you can produce hard copy in the field.

This HP-IL compatible printer/plotter automatically centers and justifies text to the left or right. It has numeric upper- and lowercase alpha, double-wide characters, and intensity control for optimum contrast and readability. Additionally, it supports STANDBY mode that lets a Series 40 controller manage its power consumption. Programming is required for Series 70 to perform this function. See the HP-75 I/O Utilities Solutions Book, 80075-12013.

#### Features

- Battery power
- Automatic centering and left or right justification
- 24-character print lines
- Both single- and double-wide characters
- 128-character set
- STANDBY mode

#### Benefits

- Take it anywhere.
- Provides formatting control, saves time.
- Makes smaller print possible.
- Allows highlighting of output.
- Allows more precise communication.
- HP-IL controller can turn printer on or off from remote location, conserve battery power.

#### Physical Specifications

**DIMENSIONS** . . . 17.8 cm (7.0 in) x 31.2 cm (12.3 in) x 9.1 cm (3.6 in)

**WEIGHT** . . . . . 888 g (1.9 lb) (includes paper and battery)

**CABLE LENGTH** . . . 60 cm (24 in)

#### POWER REQUIREMENTS

**Battery** . . . . . 4-sec. cell, 3.4 to 4.0 volt, quick-charge, nickel-cadmium battery pack

**Battery current** . . . . . 280 mA (idle), 9 A (printing)

**Recharging time** . . . . . 34 to 46 hours (printed plotter on or off)

**Operating time** . . . . . 3 to 4 hours

#### CHARACTER SETS

60 standard ASCII  
127 modified expanded ASCII

#### SPECIAL MODES

Normal, Page, Bar code, Column, Double-wide, Single-wide, Graphics, 8-inches

#### PRINT FORMAT

24 standard characters, 12 double-wide characters, 128 dots/lines per line  
Upper- and lowercase letters  
Special character generation  
Plotting capabilities  
24-character buffer

#### PRINTING

**SPEED** . . . . . 24 characters/sec

#### OPERATING REQUIREMENTS

**Operating temperature** . . . 0° to 40°C (32° to 113°F)  
**Operating humidity** . . . . . 15% to 85% (50° to 104°F)

#### Storage

**Temperature** . . . . . -40° to 55°C (-40° to 131° F)  
**Humidity** . . . . . 10% to 90% (non-condensing) at 40° C

#### THERMAL PAPER

**Width** . . . . . 5.7 cm (2.2 in)  
**Roll length** . . . . . 25 to 100 ft  
**Colors** . . . . . blue, black  
6 reflections

#### INTERFACE

**Type** . . . . . HP-IL (Hewlett-Packard Interface Language)

**Startup conditions** . . . . . normal (inactive) or active-line-on, selected at power-on

**Default address** . . . . . undriven (normal status) or 1 (active-line-on status)

## HP 82905B Impact Printer

Operating bidirectionally at 80 characters per second, this 80-column (full-page) printer produces forms quickly and legibly.

It has a standard 128-character set with upper- and lowercase letters and true descenders. And you can choose from five print modes.

The test mode of this dot-matrix printer has a logic-socket feature that finds the shortest route. Programmable line spacings, in increments of 1/64 inch, let you print superscripts and subscripts. A Roman character set allows multi-lingual printing.

The HP 82905B prints single or multipart forms (up to three parts), each with a maximum thickness of 0.3 mm. Its adjustable tractor feed can be used with all types of computer forms with widths between 4 in (10.2 cm) and 10 in (25.5 cm). Programmable page length lets you define page size and skip perforations.

### Features

- Up to 132 characters per line
- Operates bidirectionally at 80 characters per second
- Programmable page length for single- or multipart forms
- Adjustable tractor feed
- Roman character set

### Benefits

- Full-page printouts available
- Produces forms quickly
- Greater control over output
- Use with all types of computer forms
- Allows printing in several languages

### Physical Specifications

**DIMENSIONS** . . . . . 18.7 cm (4.7 in) x  
37.4 cm (14.7 in) x  
38.5 cm (15.0 in)

**WEIGHT** . . . . . 5.5 kg (11 lbs)

#### POWER REQUIREMENTS

Power source . . . . . HP 10 Dpt, 002, 005, 004  
(100V)  
100-01, Opt. 248, 348, 448  
(120V)  
005-003, Opt. 248, 348,  
448 (220V)

Frequency . . . . . 50/60 Hz

Power

consumption . . . . . 100VA maximum

#### OPERATING REQUIREMENTS

Operating temperature . . . . . 5° to 10°C (40° to 90°F)

Humidity . . . . . 30% to 80% relative

dew-point

#### PRINT FORMAT

Technique . . . . . automatic impact  
Speed . . . . . 80 characters bidirectional, logic-socket in test mode

Test mode character  
cell structure . . . . . 9 x 9 dot-matrix  
Graphics mode character  
structure . . . . . 72 x 64 or 72 x 128 dots/in

#### Character

per line . . . . . 48, 68, 80, 112

Line feed rate . . . . . 5 lines/sec

#### Print Pitch

(CPI) . . . . . normal

5.0 . . . . . normal expanded

6.75 . . . . . compressed

8.25 . . . . . compressed

10.0 . . . . . expanded

10.0 . . . . . normal compressed

Character set . . . . . 96 (ASCII)

Roman Extension . . . . . 40

#### FORMS HANDLING

Form reader

Programmable page length

Automatic perforation skip

Variable vertical line

spacing . . . . . 1/64 in standard;  
programmable to various  
line densities

#### FORMS SPECIFICATIONS

Form width

range . . . . . 10.2 cm (4 in) to 25.4 cm

(10 in)

Paper thickness . . . . . 0.3 mm (0.01 in)

maximum

Multipart forms . . . . . original plus 2 copies

#### PRINT BUFFER

One line, or up to 132 characters

## HP® 2671A/G Alphanumeric/Graphics Thermal Printers

The HP 2671A Alphanumeric Printer is both quiet and fast — 120 characters per second with a smart, bidirectional print path. The 9 x 15 dot matrix provides excellent character definition. Highlight with an underlining feature, print standard English or use Roman Extension for multilingual text.

In addition to all this, the HP 2671G offers high-resolution graphics capabilities for charts, tables, illustrations, and graphs.

### Features

- High throughput.
- Quiet.
- 9 x 15-dot matrix.
- Choice of paper available.
- Choice of print modes.

### Benefits

- Rapid printing.
- Quiet in quiet areas.
- Excellent character definitions.
- Use flat-fold forms or roll paper.
- Multilingual output.

### Physical Specifications

**DIMENSIONS** . . . . . 10.3 cm (4.1 in) x  
42.6 cm (16.8 in) x  
42.4 cm (16.7 in)

**WEIGHT** . . . . . 5.9 kg (13 lbs)

#### POWER REQUIREMENTS

Line voltage . . . . . +5%, -10%  
HP III Built-in  
HP-E, Opt. 048  
PS-202 Opt. 040  
100, 120, 200 and 240 Vac, switch selectable  
Frequency . . . . . 47-60 Hz  
Power  
consumption . . . . . 15 watts maximum  
non-printing  
30 watts maximum  
printing

#### OPERATING REQUIREMENTS

Operating  
temperature . . . . . 5° to 35°C (41° to 95°F)  
Humidity . . . . . 10% to 90% noncon-  
densing

#### PRINT FORMAT

technique . . . . . daisy-wheel, thermal  
type . . . . . 120 characters per  
line, bidirectional, left-margi-  
ning in text mode

Character  
structure . . . . . 8 x 15-dot matrix

Print Pitch	Line Length (Characters)
16.26	132
10.00	80

Character Sets . . . . . (128 U.S./CAN.)  
Line drawing  
Roman Extension (inter-  
national characters, 8-bit  
mode)

#### FORMS HANDLING

Form feed function  
Margin control

#### FORM SPECIFICATIONS

Thermal paper  
width . . . . . 71.6 cm (28 in)  
Paper options include fan folded, page per-  
forated, roll or roll, page perforated

#### OTHER PRINTING FEATURES

Underlining, character enhancement

#### OTHER

2671G raster graphics; Type; Unidirectional  
vector graphics; copy 90 dots/in horizontal  
and vertical resolution; 320 dots across a  
center row

## HP 7470A Graphics Plotter

The HP 7470A Graphics Plotter uses a two-pen system to produce high-quality color charts and graphs that fit in your briefcase and go with you anywhere. It works with paper or overhead transparency film for your professional presentations.

More than 40 HP-GL (Hewlett-Packard Graphics Language) instructions are built in, letting you program the plotter to perform a variety of complex operations, such as selecting pen velocity and defining your own characters. Text can be written in any direction, with or without slant, and in many sizes. Built-in symbol plotting and seven dashed-line fonts help you clarify complex relationships.

### Features

- High-quality graphics.
- 6000 points in a one-inch line (.001 in or .025 mm).
- Lines plotted up to 15 inches (38 cm) per second.
- Two built-in pen stacks; swap in additional pens as needed.
- Four internal character sets.

### Benefits

- Achieve more precise results.
- Fine resolution of lines and curves.
- Generate plots in minutes.
- Print with two or more colors.
- Eliminate need for software-generated characters.

### Physical Specifications

**DIMENSIONS** . . . 12.7 cm (5 in) x  
43.2 cm (17 in) x  
34.3 cm (13.5 in)

**WEIGHT** . . . . . 6.1 kg (13.5 lbs)

#### POWER REQUIREMENTS

- 10%, + 5%  
50-60 Hz Dpt. 001  
HP 890 Cpt. 002  
HP 811 Cpt. 001

#### OPERATING REQUIREMENTS

Operating  
temperature . . . 40° to 60°C (104° to 141°F)  
Storage  
temperature . . . -40° to 70°C (-40° to 167°F)

#### PLOTTING AREA

Y-axis . . . . . 190 mm (7.5 in)  
X-axis . . . . . 275 mm (10.7 in)  
matrix setting  
254 mm (10.2 in) English  
setting.

#### MEDIA SIZES

8 1/2 x 11 in (ANSI A), 110 x 157 mm (ISO A4)

#### RESOLUTION

Smallest addressable  
step size . . . . . 0.002 mm (0.001 in)

#### REPEATABILITY

Width a  
given pen . . . . . 0.1 mm (0.004 in)  
From pen  
to pen . . . . . 0.2 mm (0.008 in)

#### PEN VELOCITY

Pen down . . . . . maximum . . . 38.1 cm/sec  
(15 in/sec)  
programmable 1 to 38  
cm/sec in 1 cm/sec  
increments  
Pen up . . . . . 30.8 cm/sec (20 in/sec)

#### ACCELERATION

Approximately 2G



## HP 82168A Acoustic Coupler (Modem)

With the portable coupler, the HP-41 and HP-73 can talk to other computers over voice-quality telephone lines from remote locations. The 300-baud device meets the Bell 103 standard and can be used anywhere a conventional (G-type) telephone receiver is available.

The battery-powered device is compatible with HP-IL (Hewlett-Packard Interface Loop). It can be turned on or off by a controller, or it automatically turns itself off after 10 minutes of inactivity. Mode changes are under software control, making communication easier.

The HP-41 Extended I/O Module, an HP-41 and HP 82168A Acoustic Coupler are all that are necessary for

### Features

- Portable, carry-in backpack.
- Operates at 300 baud.
- Automatic power off.
- HP-IL command controlled.

Series 40 operation of this battery-powered modem.

Data Communications Pac software is the quickest and easiest way to operate the coupler with Series 70 computers. You also can use the combination of I/O Utilities Card (available in the HP-73 Utilities Card Solutions Book, 00075-13013) and Asynchronous Terminal Emulator Program. The terminal emulator

### Benefits

- Can be used from any conventional (G-type) phone receiver. Send or receive data while away from the office.
- Compatible with most public and private data bases.
- Minimal power drain.
- Fully automatic operation.

program may be found in the HP 82168A Acoustic Coupler manual.

For additional data communications information, see the HP 82168A, HP-IL-85-232C Interface, page 17.

### Physical Specifications

Dimensions . . . 10.7 cm (4 1/8 in) x 9.7 cm  
3.8 in x 3.7 cm (2.2 in)

Weight . . . 450 g (15.8 oz)

### POWER REQUIREMENTS

2.2 to 4.8 Vdc

Recharge

Input . . . . . 90 to 120 Vac, 50 to 60

Hz, 7 watts

Output . . . . . 8 Vac, 3 watts maximum

Power

consumption . . . 140 mW

### OPERATING REQUIREMENTS

Operating

temperature . . . 32° to 49°C (32° to 117°F)

Charging

temperature . . . 15° to 43°C (59° to 104°F)

Storage

temperature . . . -40° to 65°C (-40° to 147°F)

### TELEPHONE INTERFACE

Data transmission

rate . . . . . 300 baud

Input buffer

capacity . . . . . 40 bytes

Output buffer

capacity . . . . . 40 bytes

Compatibility . . . Bell-type 103 series

coupler

Transmit frequency

(Hz) . . . . . 1070, 1270 (teletype mode)

Receive frequency

(Hz) . . . . . 1070, 1270 (teletype mode)

Frequency stability

control . . . . . crystal (parallel)

Receiver

sensitivity . . . . . 15 dBm (nominal)

Transmit

level . . . . . 15 dBm (nominal)

Modulation . . . . . Frequency Shift Keyed

(FSK)

Carrier detect

delay . . . . . 3.5 sec (average)

### CONTROL PROTOCOLS

ENQUIRE

ACKNOWLEDGE

NO ANSWER

# Hewlett-Packard Instruments

## HP 3488A Digital Multimeter\*

HP's first HP-IL (Hewlett-Packard Interface Loop) instrument is a low-cost, autorangeing digital multimeter for Series 70 and Series 40 portable and bench applications. It electronically calibrates itself, measures ac and dc voltages and currents and makes four-wire and two-wire resistance measurements.

The device has 5½ to 3½ digits, five functions, and a 1-µV sensitivity.

### Features

- 3½-digit precision.
- 1 µVdc and ac resolution, 300 volts maximum.
- HP-IL interface.
- 3½- to 3½-digits of resolution; auto-zero ON or OFF; speeds of 50 to 2.7 sps.
- Electronic calibration and self-test.
- Optional battery pack.

### Benefits

- Accurate measurements for high performance needs.
- High sensitivity to detect small changes.
- Low-cost automatic measurements.
- Selectable speed vs. accuracy for measurement flexibility.
- Low-cost calibration, assures proper functioning.
- Portability and isolation.

## HP 3421A Data Acquisition/ Control Unit\*

The Data Acquisition/Control Unit provides low-cost automated measurement and control for your portable and bench test needs. Scan and measure up to 30 differential channels or 30 single-ended channels of dc and ac voltage, resistance, temperature, and frequency or read and write digital information and activate control signals. It stores up to 30 analog readings in an internal buffer for later use by the computer.

### Features

- Battery power.
- Display shows channels closed, digital status, and self-test conditions.
- Electronic calibration and self-test.
- Built-in 500,000 count A/D with 1-µV sensitivity and good noise rejection.
- Front controls scan in parallel with the scanner's control bus.
- Supports both HP-IL to HP-IB or HP-IL/HP-IB interfaces.

### Benefits

- Take it anywhere.
- See what's happening at a glance.
- High reliability and repeatable results.
- Measure transducers with confidence.
- Measure dc volts, ac volts, ohms, frequency or thermocouples conveniently on the bench.
- Choose between low battery power and high computer performance.

\*Not available in Israel. Contact your nearest HP sales office for more information.

# Hewlett-Packard Interfaces

## HP 82169A HP-IB Interface

The HP 82169A expands Series 70 and Series 40 control and communication capabilities by linking low-cost HP-IL (Hewlett-Packard Interface Loop) systems with high-performance HP-IB (IEEE 488) computers and lab equipment. It puts at your disposal a variety of peripherals, instruments, and computers, including more than 120 HP-IB-compatible devices made by HP and many more offered by other manufacturers.

With the HP-IL/HP-IB interface, you can operate HP-IB versions of the HP 82903B printer and the HP 7470A and HP 8872B plotters; operate and control power supplies and instruments such as the HP 1890 oscilloscope; and talk directly with HP-IB computers such as HP Series 100, 200, 1000, and 3000.

## HP 82164A RS-232C Interface

The HP 82164A is a fully asynchronous bi-directional interface that lets an HP-IL (Hewlett-Packard Interface Loop) controller, such as Series 70 or Series 40, talk to and work with computers, terminals, peripherals, and modems.

## HP 82163 HP-IL 32-Column Video Interface

You can use this interface to display data and listings from HP-75 or HP-41C/HP-IL systems on YHP TV and TV monitor screens.

The display memory, consisting of 992 bytes, holds 31 lines of up to 32 characters. Successive lines may be viewed on the display at one time, and remaining lines are viewed by scrolling them onto the screen.

Characters can be displayed in inverse video (dark characters on light background).

HP 82163A: U.S.  
HP 82163B: European

## HP 82165A GPIO Interface

With this general purpose byte (8-bit) interface, an HP-41 or HP-75/HP-IL system can talk to and work with printers, special instrumentation, and other equipment with parallel bus-structures. It contains port buffering and a built-in power supply.

## HP 82938A Series 80 Interface

With the HP 82938A, a Series 80 computer can act as a system controller or device in an HP-75 or HP-41C/HP-IL (Hewlett-Packard Interface Loop) system. You can take advantage of Series 80 graphic capabilities to display information in easy-to-understand graphs and charts. Or, with Series 80 data communication products, you can pass information to larger computers.

## HP 82166C HP-IL Interface Kit\*

This prototyping kit contains four sets of components and all the documentation needed to design HP-IL (Hewlett-Packard Interface Loop) capabilities into micro-processor-based devices.

The kit includes:

- HP-IL Integrated Circuits. These general purpose ICs provide a convenient interface between most standard microprocessors and HP-IL.
- HP-IL Transceiver Set. This component provides electrical isolation of devices on the loop, as well as voltage level conversion and impedance matching.
- HP-IL Panel Receptacle. It provides a foolproof mechanical method of connecting HP-IL devices.

These components may be purchased individually when design is completed.

\*Not available at retail. Contact your nearest HP sales office for more information.

# Hewlett-Packard

## HP-75 Software

### VisiCalc® 00075-15014

You can perform spreadsheet analysis anywhere with HP-75 VisiCalc Application Pac software. Simply plug the 32K-byte ROM module into your HP-75 Portable Computer to organize lists, to file your data, to evaluate alternative courses of action, and to get your answers instantaneously.

#### Applications

Types of applications for the HP-75 VisiCalc include:

**Finance.** Analyze stock and bond portfolios; organize rental property records.

**Business.** Calculate break-even points and income; analyze cash flow, planned expenses, and professional service fees; compute depreciation; keep travel expense and billing records.

**Sales.** Calculate sales vs. overhead and retail mark-up; forecast sales; keep an account register and travel expense record.

**Statistics.** Analyze tabular data gathered in the field.

**Science/Engineering.** Perform experimental data reduction and engineering design analysis.\*\*

HP-75 VisiCalc is a complete software solution with unique file and program capabilities.

- With VisiCalc software plugged into an HP-75 you can store multiple worksheets in memory at the same time. One worksheet may call data from another worksheet and use this data in calculations.
- VisiCalc formulas may call up BASIC programs. With this tool, you can create your own extension functions for specialized computation.

#### Features

- User-defined columns and row headers.
- Multiple worksheets in memory.
- Formulas access other worksheets in memory.
- Access to BASIC programs from worksheets.
- Variable column widths.
- Full-line editing of cells.
- Alternate viewing windows.
- Expandable with HP-41 peripherals.

#### Benefits

- Identify cell entry easily.
- Access worksheets quickly and easily.
- Simplify and structure a large task by spreading it over several manageable worksheets.
- Define your own functions.
- Control report formatting.
- Save time when changing long data entries or formulas.
- Perform "what if" analysis anywhere.
- Create a desktop system to print results, store worksheets, or view progress on a video display.

- Using BASIC programs, you can redefine how HP-75 VisiCalc works. You can add new command capabilities such as sorting, searching, input screening, and much, much more.
- HP-75 VisiCalc lets you identify rows and columns with easy-to-remember names instead of letter/number coordinates. And there's no need for full-screen viewing. For example, column C might be March and row 6 Taxes. On the HP-75's single-line display, which shows one cell at a time, you'd see cell C6 as [March/Taxes]. Column and row names also can be used in formulas. For example, total year taxes may be defined as SUM[January/Taxes] . . . [December/Taxes].
- Getting "what if" results is fast and easy with the Alternate Viewing Window. Simply change a value in the primary worksheet window, then move to the alternate window with a single keystroke to review results.
- The "GO TO" command gives you direct access to any cell (intersection of each column and row) on the worksheet.
- You can review worksheet status (global and local formatting, current cell type, recalculations order and mode, etc.); view user-defined or default headers; view a cell's formula or results; and view full precision or integer/dollar display formats.

\*Available January 1983.

VisiCalc® is a registered trademark of VisiCorp.

\*\*HP-75 VisiCalc employs many technical applications because it can access the extensive HP-75 memory, including extensions such as the Math Pac (see page 23).

## Product Specifications

- 1 528-Kbyte ROM
- 3 Preformatted magnetic disks
- 1 Keyboard (optional)
- Driver's manual
- Programmer's reference manual
- Quick reference guide

## PHYSICAL SUPPORT

- HP 8202A HP-E, 9-inch Video Monitor or
- HP 8201B HP-E, 12-inch Video Monitor
- HP 82163 Video Interface
- HP 82000 Impact Printer
- HP 82161A Digital Cassette Drive

## VERBAC COMMANDS

- |           |                   |
|-----------|-------------------|
| DS—Delete | P—Print           |
| F—Format  | R—Replicate       |
| CL—Global | V—Value           |
| HL—Header | PR—Print          |
| I—Insert  | ^—Repeating label |
| M—Move    |                   |

All of the HP-71's numeric functions may be used in cell formulas, except LOG, MOD, PDS, and YAL. In addition, the following VerCalc functions are provided:

ARITHM(list)—Computes arithmetic mean or average of numeric parameters in the list.

- ERR(list)—Results in an "Error" value that makes all expressions using the value display ERR(list) in the cell display.
- MAX(list)—Computes the maximum value in the list.
- MEAN(list)—Computes arithmetic mean of values in the list.
- MIN(list)—Computes the minimum value in the list.
- NA—Results in a "Not Available" value that makes all expressions using the value display NA.
- SUM(list)—Computes the sum of the values in the list.

## Text Formatter

00075-15019

With portable Text Formatter software and an HP-75, you have word processing power at your fingertips anytime, anyplace. Simply plug the 8K-byte Application Pac module into the computer to create memos, letters, reports, and other short documents quickly and easily.

### Applications

Applications for Text Formatter include:

**On the plane.** Prepare rough drafts and finished reports.

**At the hotel.** Review and edit notes for next-day presentations; write travel reports.

**At the client's office.** Prepare last-minute documents while waiting; take notes in conference.

**At your office.** Write memos and business reports.

**At home.** Catch up on correspondence.

Text Formatter is the perfect complement to the HP-75's built-in text editing capability. The text editor lets you input and modify text (insert, delete, search for words, insert or delete characters, words, or blocks of text). Text Formatter lets you control the appearance of the text (delete paragraphs, set headings, number pages, and justify text).

You can store up to ten pages of text in the HP-75 with an HP 82700A 8K-Byte Memory Module.

Text Formatter's command set is easy to learn, use, and remember. Five commands define the document's structure:

- set margins.
- set number of lines per page.

### Features

- Simple command set.
- Compact, portable size.
- Filing system.
- Review and correct input.
- Distribution list command.
- Merge file command.
- Help file.
- Page testing.
- Custom overlay.

- set line spacing.
- turn page numbering on and off.
- set justification.

Additional commands let you:

- define new paragraphs.
- advance to the next page.
- skip lines.
- set tabs.

Commands consist of two-character abbreviations preceded by a caret (^) that you can set once at the start of the document or change at any time throughout the text. You enter the commands as you create the text file.

There are four ways to process your text.

- Center Mode centers text between specified margins.
- Copy Mode lets you output text exactly as it was entered, including all spaces. Each line begins printing at the left margin.
- Fill Mode lets you enter text without worrying about margins or spacing between words. Extraneous spaces are removed and words are printed

### Benefits

- Learn a small number of commands easily.
- Take it anywhere.
- Keep command record of current documents.
- Never have to retype.
- Keep up-to-date lists. Create copy automatically. Personalize documents.
- Add standard paragraphs whenever you need them.
- Quick, convenient command set reference.
- Specify conditional page advance if it looks like two-page copy.
- Learn, remember, and enter new-defined commands quickly and easily.

- up to the right margin. If a word is too long to fit on the current line, it will begin on the next line or page.
- Justify works similarly to fill mode, except that each line is justified for both left and right margins. If a word is too long to fit on the current line, additional spaces are added between words on that line so that text is aligned with left and right margins.

You also get these convenient features:

- Distribution List Command. Personalize your letters and save time with this command. It automatically creates an individual copy for each person on your list.
- Merge File Command. Insert those often used paragraphs and letter-heads whenever you need them.
- Slide Command. Create quality, professional transparencies for presentations and reports with the HP 7400A Graphics Plotter.
- Help Facility. Press a single key to list all commands and their functions.

- Custom Overlay: Makes user-defined keys easy to learn, remember, and enter.

#### Product Specifications

1 88-Kbyte ROM  
2 Preformatted magnetic disks  
1 Keyboard overlay  
Owner's manual  
Quick reference guide

#### PERIPHERAL SUPPORT

HP 820000 Impact Printer  
HP 7470A Graphics Plotter  
HP 82160A Digital Cassette Drive

#### CAPACITY

Approximately 46 pages with the HP-33 Portable Computer  
Approximately 80 pages with an additional HP 82700A 88-Kbyte Memory Module.

#### COMMAND SUMMARY

ADV—Advance page  
CD—Center mode  
CO—Copy mode  
DS—Distribution list

FI—Fill mode  
FI—Justify mode  
MA—Margins  
ME—Merge  
PA—Paragraph  
PL—Page length  
PM—Automatic page numbering  
SK—Skip lines  
RL—Ruler  
SP—Spacing  
TA—Tab

## Math Pac 00075-15015

The Math Pac is a powerful analytical tool for solving a wide range of mathematical problems. Its function set consists of a group of easy-to-learn BASIC commands that range from simple numeric and string functions to a sophisticated polynomial root-finder. With the 16K-byte module plugged into the HP-75, these commands are instantly available for your programs or for direct execution in the computer's calculator mode.

### Applications

The Math Pac's comprehensive function set is useful for engineers, scientists, and mathematicians in many applications.

**Radio Engineers.** Use hyperbolic trigonometry to solve transmission line problems.

**Mechanical and Structural Engineers.** Use the definite integrals function to solve stress distribution problems.

Math Pac's function set includes:

- Real scalar functions.
  - Logarithms, round, truncate, factorial, and Gamma functions.
  - Hyperbolic and inverse hyperbolic sine, cosine, and tangent.
- Base conversions.
  - Binary/hexadecimal/octal to decimal conversion.

### Features

- Broad, diverse function set.
- Powerful, sophisticated algorithms.
- BASIC command set.
- All functions and operations written in the HP-75's assembly language.
- Takes advantage of HP-75's built-in math capabilities.

### Benefits

- Solve most kinds of math problems, simple and complex.
- Solve problems quickly and efficiently.
- Program with ease and versatility.
- Enjoy precision, accuracy, and speed.
- Let you select integer or decimal precision or full floating decimal to display results.

—Decimal to binary/hexadecimal/octal conversion.

- Convenient input and output of arrays.
- Explicit and implicit array redimensioning.
- Extensive real and complex matrix operations.
  - Inversion, system solution, determinant, transpose, and array arithmetic.
  - Can handle arrays of arbitrary size.
- Complete set of complex functions.
- Sophisticated polynomial root-finder.
  - Locates all roots (real and complex) of a polynomial with real coefficients.
  - Can solve up to degree 560 (with the 8K memory expansion module). 16K can solve up to degree 560.

- Solution to  $f(x) = 0$ .
  - Solves a user-defined function for a real root.
- Definite integrals.
  - Evaluates definite integrals of user-defined functions.
  - Can compute improper integrals.
- Finite Fourier Transform.
  - Computes the complex to complex finite Fourier Transform.
  - Sophisticated algorithm achieves high speed.
  - May be used to compute inverse transforms.
  - May be used to compute Fourier sine/cosine series coefficients.

### Product Specifications

1 16K-byte ROM  
Owner's Manual  
Quick Reference Guide

### FUNCTION SET OVERVIEW

- Complete set of numeric and base-conversion functions.
- Explicit and implicit array redimensioning.
- Extensive real and complex matrix operations.

- Convenient input and output of arrays
- Complete set of complex functions
- Sophisticated polynomial root finder
- Solution to  $f(x) = 0$
- Definite integrals
- Fast Fourier Transform



## STATEMENTS AND FUNCTIONS

**ABSUM**—Sum of absolute values of elements in array.

**ACOSH**—Inverse hyperbolic cosine.

**AMAX**—Max of largest element in array.

**AMIN**—Min of smallest element in array.

**ASINH**—Inverse hyperbolic sine.

**ATANH**—Inverse hyperbolic tangent.

**BITH**—Decimal to Binary/Hexadecimal/Octal conversion.

**BNVL**—Binary/Hexadecimal/Octal to decimal conversion.

**CNORM**—Largest sum of absolute values of elements in each column of array (column norm).

**COSH**—Hyperbolic cosine.

**DET**—Determinant of matrix.

**DET1**—Determinant of test matrix inserted in **MINIFY** statement or specified as first argument in **MAX SYS** statement.

**DSUM**—Sum of products of corresponding elements (scalar product or scalar product).

**FACT**—Factorial/Gamma function.

**PNORM**—Square root of sum of squares of elements in array (Euclidean norm or Euclidean norm).

**FNROOT**—Finds root of user-defined function.

**INTEGRAL**—Evaluates definite integrals of user-defined functions.

**LBND**—Lower bound of array subscript.

**LOGA**—Base 7 log of X.

**LOGX**—Base 2 log of X.

**MMI**—Assigns value of numeric expression or values of all elements of operand array to elements of result array.

**MAT (+, -, \* , /)**—Performs specified arithmetic operations between two arrays.

**MAT /**—Scalar—Multiplies an array by a scalar.

**MAT FACTOR**—Complex inverse cosine.

**MAT CACOSH**—Complex inverse hyperbolic cosine.

**MAT CADD**—Complex number addition.

**MAT CASIN**—Complex inverse sine.

**MAT CASINH**—Complex inverse hyperbolic sine.

**MAT CANANH**—Complex inverse hyperbolic tangent.

**MAT CATTN**—Complex inverse tangent.

**MAT CCB**—Complex cosine.

**MAT CCEOSH**—Complex hyperbolic cosine.

**MAT CCDET**—Determinant of a complex matrix.

**MAT CDDY**—Complex number division.

**MAT CEXP**—Complex exponential.

**MAT CIDN**—Complex identity matrix.

**MAT CINV**—Inverse of a complex matrix.

**MAT CLOG**—Complex logarithm.

**MAT CMMULT**—Multiplication of complex arrays.

**MAT CMULT**—Complex number multiplication.

**MAT CON**—Assigns value 1 to all elements of array.

**MAT COSG**—Conjugate of a complex number.

**MAT CPOWER**—Complex involution.

**MAT CPGW**—Polar to rectangular conversion.

**MAT CREFC**—Reciprocal of a complex number.

**MAT CROBTN**—All  $N$  complex  $N$ th roots of a complex number (eval implicitly subdivided to  $N \times 2$ ).

**MAT CROPR**—Finds cross product (vector product) of two 3-element vectors.

**MAT CRTOP**—Rectangular to polar conversion.

**MAT CSIN**—Complex sine.

**MAT CSINH**—Complex hyperbolic sine.

**MAT CSQR**—Complex square root.

**MAT CSUB**—Complex number subtraction.

**MAT CSUM**—Sums values of elements in each column of array.

**MAT CSYS**—Solves a system of complex linear equations.

**MAT CTAN**—Complex tangent.

**MAT CTANH**—Complex hyperbolic tangent.

**MAT CTEN**—Complex transpose.

**MAT DISP**—Displays elements of arrays.

**MAT DISP USING**—Displays elements of arrays according to format string specified in this statement or in **INACT** statement whose statement number is specified.

**MAT FOUR**—Complex to complex Fast Fourier Transform.

**MAT IONE**—Assigns value 1 to all diagonal elements of matrix, and value 0 to all others.

**MAT INPUT**—Assigns values input from keyboard to elements of arrays.

**MAT INV**—Finds inverse of matrix.

**MAT LFACT**—Performs LU factorization of a matrix.

**MAT PRINT**—Prints elements of arrays.

**MAT PRINT USING**—Prints elements of arrays according to format string specified in this statement or in **INACT** statement whose statement number is specified.

**MAT PROCT**—Finds all roots (real & complex) of a polynomial with real coefficients.

**MAT READ**—Assigns values listed in **DATA** statements to elements of arrays.

**MAT RSLM**—Sums values of elements in each row of array.

**MAT SYS**—Solves matrix equation  $AX = B$  for unknown array  $X$ , given  $m \times n$  square matrix  $A$  and any other array  $B$ .

**MAT TRN**—Finds transpose of array.

**MAT ZER**—Assigns value 0 to all elements of array.

**MAXAB**—Largest absolute value of any element in array.

**MINAB**—Smallest absolute value of any element in an array.

**RESIZE**—Changes working size of arrays to size specified.

**RNDNM**—Largest sum of absolute values of elements in each row of array.

**ROUND**—Round X to Nth digit.

**SNH**—Hyperbolic sine.

**SUM**—Sum of elements in array.

**TANH**—Hyperbolic tangent.

**TRNSMAT**—Transpose X to Nth digit.

**UBND**—Upper bound of array subscript.

## Surveying Pac® 00075-15012

This handy Application Pac software gives you one integrated program that simply and easily handles your routine surveying calculations. Plugged into the HP-75 Portable Computer, it permits convenient data entry in the field, followed by quick, easy calculation in the field or back at the office.

### Applications

The Surveying Pac is a portable solution that lets land surveyors and engineers handle calculations involved in:

- Traversing
- Inversing
- Coordinate geometry
- Curve layout
- Radial staking

The Surveying Pac has a unique system that lets you enter data in a variety of ways: by using bearings, north and south azimuths, angles left or right, and horizontal deflections left or right. You can choose any of these input modes independently of the output mode desired.

Its friendly, menu-driven system eliminates the need to memorize cumbersome commands or to use keyboard overlays. Descriptive prompts guide you through each

### Features

- Provides one integrated program rather than a collection of individual routines.
- Anticipates desired results and prompts for missing inputs.
- Flexible data entry system.
- Surveying routines can access stored data files or prompt you to create a new file.
- Can transfer from one routine to another, including user-written programs.
- Menu-driven prompting.
- Checks inputs for validity, loops and displays warning for invalid data.
- HP-75 built-in card reader.
- HP-41C peripherals available.

### Benefits

- Solves a wide range of surveying problems.
- Get answers quickly, easily.
- You don't have to change field procedure to use the system.
- Enter data in the field and calculate results. Or store data for analysis back at the office.
- Takes the system to your needs with your own programs.
- Networking with owner documentation in the field.
- Save time. Automatically erases checking screen as data is entered and prevents reentering or losing of files.
- Enjoy convenient, portable, comprehensive mass storage medium.
- Find or store results in the field with HP-41C portable peripherals.

function. And if a mistake is made, the system displays an error message and allows recovery of the data.

You'll also appreciate these features:

- The HP-75 is a BASIC language machine, so subprograms can be easily modified for custom applications.
- The HP-75 can maintain an X-Y-Z (northing, easting, elevation) data

file. All coordinates are stored immediately and can be recalled at any time. Points also may be transferred to Series 80 Personal Computers via HP-IL (Hewlett-Packard Interface Loop).

- Output is tailored to your specifications. You choose the units, number of decimal places to print, bearings vs. full-circle azimuths, etc.

## Product Specifications

1 MB-byte ROM  
Owner's Manual

### PERIPHERAL SUPPORT

HP 82400 Impact Printer  
HP 82410 Thermal Printer/Plotter  
HP 82410 Digital Cassette Drive  
HP 82410 Video Interface  
HP 82410 9-inch Video Monitor or  
HP 82410 12-inch Video Monitor

### CAPACITY

Approximately 400 data points can be stored  
with the HP-75 Portable Computer.  
Approximately 1000 data points can be  
stored with the add-in HP-82500A  
8K-byte Memory Module.

## COMMAND SUMMARY

### Point Manipulation

Enter & Assign	Rotate
List	Translate
Clear	Scale
Display	

### Field Control

Enter & Redraw Field Notes  
Shape Redaction  
Field Shells  
Computer Error at Closure  
Angle Balance  
Bowditch or Compass Rule Balance  
Crawford's Rule Balance  
Radial Scale Out

### Coordinate Geometry

Inverse  
Inverse  
Routing/Routing Intersection  
Routing/Distance Intersection  
Distance/Routing Intersection  
Distance/Distance Intersection  
Inscribed Curve with Straight Tangents  
Inscribed Curve with Curved Tangents  
Inscribed Curve with Straight & Curved  
Tangents  
Curve Inverse  
Solve for a Curve Given Arc Length  
Solve for a Curve Given Chord Length  
Solve for a Curve Given Central Angle  
Solve for a Curve Given Tangent Length  
Compute Area (including curved sides)

## Data Communications Pac\* 00075-15035

With the Data Communications Pac, an HP-75 and a modem, you have easy access to other computer systems or to commercial time-sharing systems such as THE SOURCE<sup>TM</sup>, Dow Jones News-Retrieval Service<sup>®</sup>, and CompuServe.

You can obtain stock quotes, send or receive mail electronically, and access complete libraries of information anywhere, anytime.

### Applications

Applications for Data Communications include:

**Finance.** At your office, retrieve up-to-the-minute stock and bond quotes for immediate analysis and action.

**Business.** At your hotel, send a memo or receive letters from your electronic mailbox, even make airline reservations.

**Sales.** At your client's office, transfer documents and other information to and from your main office's host computer.

**Science.** In the field, send gathered data to your lab computer for processing.

Data Communications is a versatile package providing terminal emulation capability for the HP-75C. Set-up files allow the HP-75 and a modem to be configured for communication with a variety of host computers.

### Features

- Connect to information systems such as THE SOURCE<sup>TM</sup>, Dow Jones News-Retrieval Service<sup>®</sup>, or CompuServe.
- Transfer text files.
- Use with an HP 82165A Acoustic Coupler, any RS-232C-compatible modem, or direct connect to host system.
- Multiple display devices.
- Menu-driven command set.
- Set-up files.
- Special code words.
- Set-up file editor.
- 800-character buffer.

### Benefits

- Access the latest information anywhere, anytime.
- Send previously written text files or receive information in instant files.
- Configure a system that meets your application needs.
- View information on the HP-75's display, printer, or video monitor.
- Access commands with a single keystroke.
- Flexible system configuration.
- Define commonly used log-on procedures, recall by code word later in the program.
- Add, change, delete or list code words in set-up files.
- Review information received when using the HP-75's display.

Special code words are used to provide flexible system configuration and to allow common log-on procedures to be stored and recalled from the program.

An editor is available to add, delete, change, or list code words in set-up files.

Other features include:

- Incoming and outgoing data may be sent to the HP-75's liquid-crystal display, a printer, and/or a video interface.
- Stores incoming information in a 500-character buffer for later review.

- Text files written offline can be transferred to a host computer.
- Incoming information may be saved in the HP-75's text file for later viewing, editing, or printing.
- Use the HP 82165A Acoustic Coupler (modem) or any RS-232C-compatible modem. Or connect directly to a host computer.

THE SOURCE<sup>TM</sup> is a service mark of Source File Computing Corp., a subsidiary of Reader's Digest Foundation.

Dow Jones News-Retrieval Service<sup>®</sup> is a registered trademark of Dow Jones & Company, Inc.

\*Available December 1986.

## Product Specifications

- 1 16K-byte ROM
- 2 Preformatted magnetic cards
- Owner's Manual
- Quick Reference Guide

### PERIPHERAL SUPPORT

- HP 82165A Automatic Copier
- HP 82164A HP-B, E, G5-CSC Interface
- HP 82960 Impact Printer
- HP 82162 Thermal Printer/Plotter
- HP 82163 Video Interface
- HP 82912A 9-inch Video Monitor or
- HP 82913A 12-inch Video Monitor

### CAPACITY

Approximately one page of information is stored in a buffer when using the LCD as

the display device for the HP-75 Portable Computer.

Approximately six pages of text can be transferred between the HP-75 and a host computer system.

Additional four pages of text can be transferred using the HP 82960A 8K-byte Memory Module.

### COMMAND SUMMARY

- H—Help.
- C—Change set-up file.
- D—Disk.
- E—Screen file editor.
- H—Hang up the phone.
- L—Toggle LCD ON/OFF.
- P—Toggle printer ON/OFF.
- Q—Leave DataComm program.
- S—Store special code word.

- T—Terminal mode.
- V—Toggle video ON/OFF.
- X—Transfer test file.

### EDITOR COMMANDS

- A—Add code word.
- C—Change code word.
- D—Delete code word.
- L—List set-up file.
- Q—Leave editor.
- T—Help.

### LCD control modes

- [BL]—Toggle between small and low display mode.
- [FRT]—Toggle between terminal and buffer mode.

# Hewlett-Packard

## HP-75 Solutions Books

Easy-to-use Series 75 Solutions Books come complete with preprogrammed magnetic cards and documentation. These ready-written programs are also available on cassettes from the Users' Library (see page 29).

### Math I (00075-13000)

- Fast Fourier Transform
- Fast Fourier Series/Trigonometric Interpolation
- Alternating Fourier Series
- Spherical Harmonics
- Elliptic Integrals
- Bessel Functions: Asymptotic Expansion
- Bessel Functions: Backward Recurrence
- Gamma Functions
- Error Functions
- Legendre Polynomials

### Math II (00075-13004)

- Simultaneous Linear Equations
- Quadratic Equations
- Parabolic Equations
- Roots of Polynomials
- Triangle Solutions
- Polygon Area
- Hyperbolic Functions
- Complex Trigonometric Functions
- Prime Factorization

### Math III (00075-13005)

- Midpoint Rule for Integration
- Trapezoidal Rule for Integration
- Romberg Rule for Integration
- Simpson's Rule for Integration
- Newton-Cotes Rule for Integration
- Euler's Method
- Newton's Method
- Trapezoidal Rule for Ordinary Differential Equations
- Runge-Kutta
- Contour Mapping

### Finance (00075-13009)

- Breakeven Analysis
- Crosses
- Bond Price and Yield
- Depreciation Calculator
- Lease vs. Purchase
- Present Value of a Geometric Series
- Present Value of an Arithmetic Gradient Series

### Games I (00075-13004)

- Adventure
- Blackjack
- Rocket Launcher
- Echo
- Word Scramble

### Games II (00075-13007)

- Football
- Hamurabi
- Slot Machine
- Golf
- Reverse
- Breakout

### Real Estate (00075-13010)

- Income Property Analysis
- Estimate of Buyer's Cost
- Seller's Costs and Net Equity
- Internal Rate of Return
- Rent vs. Buy
- Variable Payment Mortgage
- Amortization Tables
- Variable Interest Rate Mortgage
- Loan Schedule

### IO Utilities (00075-13013)\*

- HP-IL Commands

### Electronics (00075-13006)

- Common Components for 555 & 567 ICs
- Ohm's Law with dBm Conversion
- Smith Chart Conversion
- Mismatch
- dB to % to dB Conversion
- Butterworth Filter Design
- Active Filter Design
- Low Pass Filter Design
- Coil Design

### Test Statistics (00075-13012)

- One-Sample Test Statistic for the Mean
- Kendall's Coefficient of Concordance
- Correlation Coefficient Test
- Intraclass Correlation Coefficient
- Karski-Wallis Statistic
- Mann-Whitney U-test
- Fisher's Exact Probability
- Two-Factor Analysis of Variance
- Bartlett's Chi-Square Statistic
- Difference Among Proportions
- Data Transformations

### Graphics (00075-13014)

- Line Plot
- Bar Chart Plot
- Pie Chart Plot

### Mass Media Duplication/Privacy (00075-13015)

### Statistics (00075-13011)

- Basic One Variable Statistics
- Coefficient of Correlation
- Probability of Normal, F, t, & Chi-Square Distributions
- Dependent (Paired) t-Test
- t-Test for 2 Unequal Sized Samples
- Chi-Square Test
- One-Way Analysis of Variance
- Simple Linear Regression
- Permutations & Combinations

\*Requires an understanding of basic level HP-IL protocol.

## Hewlett-Packard Software Development Tools

By itself, the HP-75 has a built-in BASIC interpreter and a comprehensive set of editing functions that smooth and speed the development of BASIC language software. The HP 82713A Plug-In Module Simulator (PMS) is added to develop and field test BASIC language custom software and to reproduce it in plug-in modules. The 16K-byte medium consists of a device that simulates a plug-in ROM module, as well as a set of Series 70 BASIC commands on magnetic cards. BASIC language programs written on the HP-75 can be loaded into the PMS and run as if they were plug-in modules. When you're satisfied the custom program is viable, HP will reproduce it in as many custom modules as needed.

PMS has a built-in lithium battery that lets it retain its contents when unplugged.



### Series 70 Custom Products

To solve your routine programming and data handling problems, you'll want to consider Series 70 Custom Product applications. Keys on the HP-75 are user-definable. Custom Keyboard Overlays make data entry quicker and easier. Up to three custom software modules can be plugged easily into the HP-75, providing as much as 96K bytes of custom ROM software. You can choose from a variety of inexpensive media for your special applications. For more information, contact your HP sales representative.

### Users' Library Software

More than 100 programs in math, business, statistics, and engineering are included in the Users' Library "Catalog of Contributed Programs" for Series 70. And the Users' Library welcomes more. The catalog contains information on how to buy and submit programs and on how to become a Library member. Program documentation includes individual program listings, and it's available with or without magnetic cards. You also can purchase programs on mini-cassettes for the HP-11 Digital Cassette Drive.

